SPECIFICATION

OF THE

MATERIALS AND WORKMANSHIP

REQUIRED IN THE ERECTION AND CONSTRUCTION OF A

U. S. Naval Hospital,

WITH ITS APPURTENANCES,

ON THE GROUNDS OF THE

UNITED STATES NAVAL ASYLUM,

SITUATED ON

Gray's Ferry Road below Shippen Street,

IN THE

CITY OF PHILADELPHIA.

JOHN McARTHUR, Jr., Architect,

No. 209 South Sixth Street.

PHILADELPHIA:
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1866.

SPECIFICATION OF THE MATERIALS AND WORKMANSHIP designed to be used in the erection and construction of a NAVAL HOSPITAL, with its appurtenances, at PHILADELPHIA, for the use of the UNITED STATES, upon a portion of the ground at present occupied by the United States Naval Asylum and enclosed by Gray's Ferry road on the east, Shippen street on the north, Sutherland avenue on the west, and private property on the south. The hospital building to occupy the northwest portion of the ground described, with the front parallel to the river Schuylkill, as shown upon diagram, marked A, accompanying the plans and elevations; the entire buildings, with all their appurtenances, to be in strict accordance with the plans, elevations and sectional drawings of JOHN MCARTHUR, JR., architect, and approved by DOCTOR P. J. HORWITZ, Chief of Bureau of Medicine and Surgery, U. S. Navy.

The entire work must be completed in a good substantial and workmanlike manner and to the full intent and meaning of this specification and to the drawings above referred to, whether expressed or implied, and to the entire satisfaction

of the architect or his legal representative, who shall have full power to refuse any materials different from those described to be used and to cause any unsound work to be taken down, altered and renewed at the contractor's expense. No allowance to be made for any extra work whatever, unless the cost of the same, previous to execution, is agreed upon in writing between the parties to this contract, or their legal representatives. It being distinctly understood that this specification, and the following plans and drawings shall form part of the contract and be held equally binding upon the parties thereto.

Any errors or discrepancies in any part of the specification or upon any of the plans, elevations, sections and drawings, submitted to the contractors, upon which proposals are invited and which are intended to form part of this contract, shall be construed in favor of the United States.

The following is a memorandum of the plans and drawings referred to, viz.:

A, No. 1. Block plan of site with location of building.
" 2. Basement of building.
" 3. First floor.
" 4. Second floor.
" 5. Attic floor.
" 6. Front elevation and longitudinal section.
" 7. Rear elevation, end elevation and transverse section.

B, No. 1. Plans, elevations and sections of engine house, laundry and fuel shed.

These plans, drawings and specifications will be supplemented from time to time as may be necessary to a perfect execution of all the work by full size detail drawings, which shall be received and considered as of equal authority with the memorandum of plans above recited.

Previous to the award of the contract the architect will furnish to any or all of the bidders, written explanations to written inquires, respecting any part of the work or materials not perfectly understood by them, reserving to himself at all times, until the completion of the work and the delivery of the buildings, the sole right to interpret his own plans, which interpretation shall be final and binding upon both parties to this contract.

The following is a general description of the buildings, with size and use of rooms, &c.:

The exterior of the building shall be constructed principally of stone, brick and wood, covered with slate and best quality roofing tin. The basement walls including the lower base, shall be faced with hammer-dressed building stone from the Leperville quarries or other equally as good; they shall be laid in broken range work and pointed. The steps of principal entrance, with cheeks and pedestals, shall be of light granite, patent hammered. The front portico, including columns, pilasters, entablature and cornice, shall be of Connecticut sandstone. The cornice, just mentioned, shall be continued across the main front and returned against the stone belts over the side entrances. All window and door-heads, belts, sills, water tables, and copings of front gables, shall be of Connecticut stone, as hereinafter more particularly specified.

The rear porches, and those in the centre of transverse wings, shall be of wood, painted and sanded. The principal facing of the walls shall be of best pressed brick, laid in rustic quoins on the corners, and paneled in frieze of main building and transverse wings.

The main building and transverse wings shall have Mansard roofs, defended on the top by ornamental iron railing. All the roofs of all the buildings, where of sufficient pitch,

shall be covered by best Peach bottom slate; all flat roofs, best roofing tin. All glazing must be done with best double thick American glass. Brick pavements, with granite curbs, must be laid around the buildings to drain the surface water through the main sewer to the river. The engine and boiler house shall be constructed of brick, with stone base and cast iron chimney cap. The coal sheds shall be of brick, and the cartways leading to them, together with yard of boiler-house, shall be of small cobble stones.

The buildings consist of one centre, 147 feet front by 63 feet deep, two stories in height, exclusive of basement and attic, (omitting the main dining room and kitchen, 48 feet 8 inches by 29 feet 8 inches, occupying the basement and first floor in rear of centre building;) two lateral wings, one on each side of the centre building, 81 feet 6 inches by 27 feet 8 inches, two stories in height, containing the principal wards, and terminating at each extremity by transeverse wings, 63 feet 6 inches long by 23 feet wide, containing the sitting-rooms, nurse-chambers, water-closets, baths, &c., for the convenience of the wards.

The basement plans exhibit, in the centre building, (commencing with the east front), one bake-house, with ovens and

store-rooms.....	18 ft. 0 in. by 29 ft. 0 in.
One cellar.....	18 ft. 0 in. by 29 ft. 0 in.
One store cellar.....	9 ft. 9 in. by 29 ft. 3 in.
Two rooms, each.....	14 ft. 6 in. by 13 ft. 3 in.
Two rooms, "	14 ft. 9 in. by 14 ft. 9 in.
Two rooms, "	12 ft. 4 in. by 13 ft. 4 in.
Main kitchen.....	26 ft. 0 in. by 32 ft. 0 in.

With store-rooms, pantries, bath-rooms and water-closets for the employees, stairs, halls, vaults, hoists, &c. Beneath the wards and transverse wings are contained the chambers for heating and ventilating; also cellars for fuel and other purposes.

First story plans contain in the centre building one principal entrance.

One reception room..... 20 ft. 0 in. by 19 ft. 0 in.
One parlor for officers..... 20 ft. 0 in. by 19 ft. 0 in.
One apothecary shop..... 18 ft. 0 in. by 14 ft. 7 in.
One officer's dining room..... 18 ft. 0 in. by 14 ft. 7 in.
Two rooms for Assistant Surgeon,
each..... 15 ft. 2 in. by 15 ft. 0 in.
Two chambers, do, connecting..... 13 ft. 8 in. by 12 ft. 11 in.
Two private wards for officers, each 14 ft. 4 in. by 13 ft. 9 in.
Two diet kitchens, communicating
with principal wards, each..... 10 ft. 0 in. by 14 ft. 0 in.
Main dining-room..... 34 ft. 4 in. by 26 ft. 0 in.

Pantries, store-rooms, dumb-waiters, water-closets, closets, staircases, halls, &c.

The lateral wings contain each one ward, 24 ft. by 81 ft. 6 in., arranged for twenty-eight beds.

The transverse wings each, one
smoking or retiring room..... 21 ft. 1 in. by 20 ft. 4 in.
Nurses' room..... 10 ft. by 12 ft.
Water-closets, baths, wash-rooms, halls, staircases, &c.

For the use of the centre building, water-closets, baths, store-rooms, &c., have been arranged in a half story adjoining the wards on each corner of the west front of main building.

The second story plan contains in the centre building:
One officers' ward..... 35 ft. 0 in. by 18 ft. 11 in.
One operating room..... 19 ft. 11 in. by 18 ft. 11 in.
One ante-room..... 18 ft. 11 in. by 9 ft. 0 in.
Two private rooms or officers'
wards, each..... 14 ft. 4 in. by 13 ft. 9 in.
Stewards' room..... 15 ft. 2 in. by 15 ft. 0 in.
Stewards' chamber..... 13 ft. 8 in. by 12 ft. 11 in.
Matron's room..... 15 ft. 2 in. by 15 ft. 0 in.
Matron's chamber..... 13 ft. 8 in. by 12 ft. 11 in.
Two diet kitchens for wards, each 14 ft. 4 in. by 10 ft. 0 in.
Water-closets, wash-room, baths, elevators, halls, stairs, landings, &c.

Lateral and transverse wings, same as in first story.				
Attic plan contains in the centre, one ward	27 ft.	9 in.	45 ft.	4 in.
Dormitory	29 ft.	0 in.	17 ft.	3 in.
Two bed-rooms each	13 ft.	0 in.	12 ft.	2 in.
Two bed-rooms each	13 ft.	9 in.	15 ft.	0 in.
One bed-room	12 ft.	3 in.	11 ft.	3 in.
Dead room	12 ft.	3 in,	11 ft.	3 in.
Two store-rooms each	11 ft.	0 in.	11 ft.	0 in.
Halls, stairs, water-closets, baths, elevators, &c.				
Over main wards, ventilating attics seven feet high, and	16 ft.	6 in.	81 ft.	6 in.
Attics of transverse wings.				
Two wards for convalescents each	23 ft.	6 in.	16 ft.	3 in.
Two wards for convalescents each	16 ft.	3 in.	14 ft.	5 in.

Heights of stories as follows:—

Basement, in clear	9 ft.	2 in.
First story	15 ft.	10 in.
Second story	15 ft.	0 in.
Attic of main building	14 ft.	6 in.
Attic of transverse wings	12 ft.	6 in.
Over wards	7 ft.	0 in.

All these heights are governed by the first floor, which is to be six (6) feet above the level of brick pavement at principal entrance.

EXCAVATIONS.

The basements and cellars must be excavated under the entire building to a clear depth when finished as follows:

That portion under the centre building, the two centre wings, kitchen and dining-room building, (tinted yellow on the basement plan,) and which shall have timber joists and floor,) shall be excavated eleven (11) feet from the under side

of the first story joists, (the bottom of which joists shall be placed five (5) feet above the level of the ground at the front of the building.

That portion of the cellar under the wards and end wings (tinted pink on basement plans,) shall be excavated to a clear depth when finished of ten (10) feet from the lower side of joists of ward buildings.

The areas shall be excavated to a clear depth when finished, of not less than ten (10) feet six (6) inches from the under side of first floor of joists. The banks to be sloped to an angle of forty-five (45) degrees and sodded.

All the banks to be dug six (6) inches at least clear of the walls, so as to allow them to be built double faced.

The trenches for the foundation walls shall be excavated to solid coarse gravel and to sufficient depth to insure a firm, solid and perfectly secure footing. All the foundation walls from the bottom of the cellar to the bottom of the foundations shall be not less than four (4) inches thicker than the walls which are placed immediately on them, and the footings of these foundations must be increased one (1) foot thicker than the foundation walls themselves.

The foundations for the areas, steps, &c., shall be excavated to a sufficient depth to insure a firm footing and to be secure from frost. Those of the main front steps to run down the same depth as the foundations of the building.

The excavation for the ventilating and heating ducts shall extend the whole length and breadth of the building, (as shown on basement plan by red line,) and from the rear of the building to the engine house, and smoke and ventilating stack, which will be situated one hundred and twenty (120) feet from the rear of the dining-room building. (See block plan.)

The main ducts shall be excavated to a depth of ten (10) feet below the cellar floor, and in width not less than five (5) feet six (6) inches; branches shall run from these ducts to the ventilating flues, and to the warm air chambers as shown on the drawings. Those running to the ventilating

flues shall be excavated two (2) feet nine (9) inches wide by two (2) feet deep, and those to the warm air chambers, two (2) feet six (6) inches wide, and to a depth so as to communicate from the fresh air duct to the warm air chambers.

The earth shall be filled in and rammed down hard and solid, behind and alongside of all walls, foundations, &c., so as to make a clean, perfect finish and prevent mischief from rain or frost. All the surplus earth excavated from the cellars and foundations, &c., shall be leveled around the building, or discharged on the dock grounds on the opposite side of Sutherland avenue, at the option of the architect. The top soil shall be placed on the adjoining ground, to be reserved for top dressing around the building. All rubbish, &c., accruing from the construction of the building shall be removed from the premises or emptied in the dock above mentioned.

FOUNDATIONS AND STONE MASON WORK.

All the cellar and foundation walls, the piers and the foundations of steps, areas, &c., throughout the whole building, shall be constructed by the contractor of the very best building stone. They must be of large size, properly prepared for the purpose, and laid in strong gravel mortar made of the best lime and clean, sharp gravel.

The footings of all the walls shall be one (1) foot thicker than the walls which are to be placed upon them. Those of the principal walls shall be made of three (3) courses of large flat foundation stone in courses not less than eight (8) and ten (10) inches in thickness; the first course laid crossways of the wall, and each stone to run the whole width of the foundation, viz., four (4) feet, and laid in a good bed of mortar and settled down hard and solid with a heavy rammer; the second course to run lengthways of the wall; and the third course crossways: the whole firmly bedded and settled

down solid, the joints filled up full and flush with strong mortar, and all leveled off to receive the walls above.

The foundation walls below the cellar floor and above the footings shall be four (4) inches thicker than the walls that rest on them above the cellar floor. The walls above the cellar floor, shown on the basement plan colored blue, shall be built double-faced between two lines and of the very best large building stone, the face shall be dashed, and that portion which is not plastered shall be whitewashed.

The thickness of the walls shall be as figured on the basement plan, and as follows: The exterior walls of the centre building and the two main ward buildings, from the cellar floor to the pavement shall be two (2) feet eight (8) inches in thickness, and from thence to the bottom of the water table to batter, so as to finish in thickness one (1) foot eleven (11) inches (see section of cellar walls on basement plan.) The exterior walls of the centre wing buildings and the end wing building shall be two (2) feet in thickness above the cellar floor to the pavements, and to batter the same as the ward walls. The interior partition walls shall be one (1) foot six (6) inches and one (1) foot ten (10) inches as shown on the plan from the cellar floor to the first story floor. The walls for the areas, steps, &c., shall be of the thickness as figured on the drawings. All the stone shall be laid on their natural beds settled down and filled in perfectly solid.

The base of the building shall consist of a base course running around the whole of the exterior one (1) foot in height, the face and beds hammer dressed and show one (1) inch wash on the upper edge; above this, and up to the bottom of the water table, the wall shall be faced with hammer dressed stone, laid in broken range work and battered, the joints neatly pointed with cement or mortar as may be desired.

The face of the walls of the building in the areas, and the face of the area walls, on the front and ends of the building, shall be built as above described. A hammer dressed base

one (1) foot in height, shall extend around the kitchen building and the areas in the rear of the centre building.

The stone used in the above-mentioned work shall be the best Lieperville stone, or other stone equal in quality. All the walls throughout shall be built straight, plumb and true, and in the most solid and substantial manner, every crevice being filled solid with mortar or cement. Water pipes for drainage shall be built in the walls as directed, and flues lined with bricks and well pargetted, placed as shown on the plans and as shall be directed. The cellar window jambs on the inside splayed and the sills sloped as shown on the sections.

Brick arches shall be turned over all the openings. The foundations of all the walls of the buildings and front steps shall run down to the coarse gravel, and as much deeper as will be required to insure a perfectly solid, firm and secure foundation, all other foundations to go down below the surface, so as to be secure from the action of frost or water; there shall be no stone foundations of interior partition walls less than one (1) foot six (6) inches in thickness.

DRESSED STONE-WORK.

The front steps, pedestals and sides of the steps, the steps to the areas and their sides, shall be of granite, patent hammer dressed, and when finished, to measure eleven (11) inch tread and seven (7) inch rise. The doorsills of the basement eight (8) inches thick, shall be of granite, dressed the same as the steps.

The coping around the areas, &c., shall be of North River flagstone, four (4) inches in thickness, twelve (12) and fourteen (14) inches wide, and shall project one and a half (1½) inches over the face of the wall, it shall be of uniform thickness, and dressed on top and edges, dowelled and clamped together where required. The basement window heads and sills (excepting those in the back areas and kitchen

building) shall be of Lieperville stone, or other equal in quality, hammer dressed.

The front portico shall be flagged with North River tile, two and a half (2½) inches thick, rubbed smooth and laid in cement.

The floors of the principal water closets and bath rooms shall be of slate tile one (1) inch thick, rubbed smooth and laid in cement. All the steps shall be set and finished in the best manner, with perfectly tight joints.

A six (6) inch dressed curbstone shall be placed around the whole building; it shall be of Lieperville stone, or other equal in quality, and a North River flagstone gutter nine (9) inches wide, well bedded in gravel, placed alongside the curbstone to carry the water to the sewer.

BROWN STONE WORK.

All the cut stone work to be used in the exterior walls above the base, and also that used in the rear areas and basement of back building, for window heads and sills, shall be of the best Connecticut brown sand stone, all sharply dressed and finely rubbed. There shall be two belt courses projecting two (2) inches from the face of the wall, each not less than twelve (12) inches high by eight (8) inches thick, dressed with a wash on the upper and drip on the lower edge; the window sills seven and a-half (7½) inches thick, and to extend two (2) inches beyond each jamb and two (2) inches beneath the frame sill. The heads of the ward windows to be segmental and ten (10) inches in width. The window heads of the centre and the end buildings shall be straight and measure twelve and a half (12½) inches in the centre, the three (3) second story window heads in the front of the centre building shall be ornamental as shown on front elevation and measure about two (2) feet at the greatest width. The door heads to be ten (10) inches wide. The door sills of the first story, brown stone, and measure ten (10) inches thick, and checked out so as to show seven

(7) inches rise on the face, and width to suit the thickness of the wall where they are placed in.

The front portico, entablature and cornice, the moulded cornice extending around the front bays and along the front of the centre building, and returns around the flanks as far as the rustics, shall be brown stone; also the architrave moulding two and a half (2½) inches thick. The columns and ante, including plinths, base, and caps to be fourteen (14) feet long and one (1) foot ten (10) inches in diameter at the base; the sill course of the front second story windows and blocking course over the cornice, the architrave band immediately below the frieze of the centre and end wing buildings shall be of brown stone, the latter two and a half (2½) inches thick. The capping and finials of the brick gables, both front and rear, shall be five (5) inches thick, and set on the brick wall so as to project four (4) inches over the face, the width to be twelve (12) inches. The chimneys must be capped with stone and clamped together at the joints.

All the above-mentioned work shall be cut, rubbed and set in the very best manner, and of the best Connecticut brown stone, cramped at the joints and made perfectly water tight and secure.

BRICK WORK.

The exterior walls and the principal walls of the interior of the building shall be of the best quality sound, well-burned bricks, (no washed bricks or soft salmon bricks shall be used). All the exterior walls are to be built hollow; those figured on the plans one (1) foot ten (10) inches shall be nine (9) inches, or one brick thick walls, with a four (4) inch space between; and those figured one (1) foot four (4) inches to be a nine (9) inch wall on the outside and a four and a half (4½) inch wall on the inside, with a two and a half (2½) inch space between. All these walls shall be bound together in a firm and substantial manner, by heading

courses laid every fifth course, and built solid three (3) courses below each floor of joists and to the top of same. All the corners and portions of the walls on which rest girders or beams shall also be built solid.

The exterior walls of the main centre buildings, the ward buildings, the dining room and kitchen, shall be one (1) foot ten (10) inches in thickness; the walls of the centre wing buildings and end wing buildings are to be one (1) foot four (4) inches thick. The interior partition walls in the basement, thirteen (13) inches thick to the top of the first floor, and from thence to the roof, nine (9) inches thick.

All the exterior walls shall be faced with the best quality pressed bricks, of a dark and uniform color throughout, and laid in the very best manner in white bar sand mortar, the joints struck and cut.

The corners to be rustic quoins of pressed bricks, and projecting one and a half (1½) inches from the face of the wall; the frieze shall be pressed bricks, paneled, as shown on the elevations.

All the mortar used for the brick work shall be made of the best lime and clean sharp bar sand with water, mixed in such proportions as shall make the strongest mortar.

Fire-places built in the rooms as shown on the drawings. The flues for heating, ventilating, and smoke, built where indicated, and as may be directed; they shall be straight and pargetted perfectly smooth on the inside, and of the size as shown on the drawings, or as shall be directed by the architect. All the smoke flues to be topped out three (3) feet above the top of the Mansard roofs, with pressed bricks, and capped with stone.

The cellar windows in front, where they extend below the pavement, walled with hard bricks—thirteen (13) inches in thickness.

Pressed brick piers, eighteen (18) inches square, built to support the verandahs.

The walls of the gables in front and rear to be thirteen (13) inches thick, and capped with stone.

The floors of the two intersols or half stories above the first story diet kitchen (containing the water-closets, bath rooms, &c.,) and the first and second floors of the rear end of the end wing buildings, where are situated the ward water closets, bath rooms, nurses' room, &c., shall be made of hard brick arches, four (4) inches thick, laid in cement, and sprung from rolled iron beams, placed four (4) feet apart, the haunches filled up level with the crown of the arches, with concrete made of brick spalls and cement, and the whole covered with a thick coat of cement trowelled off hard and smooth, and made water-tight; upon this is to be placed the slate tile floor laid in cement.

Nine (9) inch brick arches shall be turned over all the openings throughout the building, and arches turned to receive the front steps.

That portion of the basement where the floors are to be of wood, shall have a coat of concrete made of gravel screenings, coarse gravel and lime, to a thickness of four (4) inches, levelled and trowelled off. In the cellars, under the wards and end wing buildings and areas, the floors are to be second quality paving bricks, laid on a bed of coarse gravel mortar, four (4) inches thick, and made perfectly rat proof.

The whole building shall be surrounded with a brick pavement, as shown on the drawing, laid in a bed of gravel eight (8) inches deep; the bricks shall be the best quality hard burned paving bricks, and laid in the best manner.

Heating and ventilating ducts shall be built under the basement and cellar floors; the main ducts each measure four (4) feet by four (4) feet, or sixteen (16) square feet on the inside, and built one above the other; the bottom one to supply fresh air to the warm air chambers, and the upper one to conduct the foul air to the ventilating stack. These ducts shall be built of hard bricks, the side walls nine (9) inches thick, with the joints struck, the fresh air duct covered with a four (4) inch arch, which separates it from the foul air duct.

The foul air duct shall be covered in like manner with a four (4) inch arch. Branches to run from these main ducts to all the air chambers and ventilating flues; those to the air chambers shall measure fourteen (14) by eighteen (18) inches, (or two hundred and fifty (250) square inches,) and those from the ventilating flues to the foul air duct, not less than twelve (12) by twenty-four (24) inches, (or two hundred and eighty-eight (288) square inches); the walls shall be built of hard bricks, four (4) inches thick, the joints struck, the bottom paved, and the whole arched over with four (4) inch arches. Man holes built to the main ducts as shall be directed. The earth filled in, rammed hard and solid all around the ducts, and levelled off to receive the concrete.

The rain water conductors from the roof, and the soil pipes shall be built in the walls, and an air space left all around them as shall be directed.

In the bake house shall be built a regular baker's oven, to burn wood or coal; the smoke and gas conducted off through a cast-iron flue not less than fourteen (14) inches in diameter, running to the top of the roof, and built inside of a brick flue. The oven built in the most substantial and approved manner, similar to that in the Continental Hotel.

SLATING.

The steep portions of the Mansard roofs, and the roof of the ward buildings, shall be covered with the very best Peach bottom roofing slate, (in one or two colors at the option of the architect,) each slate being nine (9) inches by eighteen (18) inches, and laid seven and three-quarter inches ($7\frac{3}{4}$) to the weather; the sheathing boards shall be covered with one thickness of the best quality roofing felt, well secured previous to nailing on the slate. The slate to be nailed fast on top of this felt, in the most secure manner, by four-penny galvanized iron nails, the courses to lap each other so as to

make three (3) thicknesses of slate. The best tin flushings being placed around all chimneys, dormer windows, &c., wherever required, valley gutters placed in all valleys, and ridge caps on all the ridges and angles, made of the best double leaded tin.

The whole of the above work shall be done in the very best manner perfectly watertight.

TIN WORK.

All the roofs, except the steep portions of the Mansard roofs and the roofs of the wards, shall be covered with the best crossed charcoal roofing tin. All the gutters, parapets, tops and sides of the dormer windows, roof of verandahs and passage to dining rooms, tops of cornices, &c., shall be covered same as the roofs, the whole shall be painted one coat on the underside and two coats on the upper. All chimneys, skylights, &c., must be flushed and puttied. The whole of the roofs, &c., must be made perfectly watertight.

The water from the flat portions of the Mansard roofs shall be conducted to the eave gutters of the main cornice by four (4) inch tin conductors placed on the angles, from thence it must be taken off through extra strong four (4) inch cast iron pipes built in the wall and conducted to the drain pipes. The eave pipes from the gutters to the cast iron conductor shall be made of No. copper.

Emerson's ventilators, or others equally as good, shall be placed in all the roofs in order to ventilate the lofts, they shall be twelve (12) and eighteen (18) inches in diameter, to suit the size of the loft.

PLASTERING.

All walls, partitions and ceilings above the basement, and all the basement, except the cellars under the wards and end

buildings, must be plastered with three (3) good coats of plastering, the last coat, hard white finish.

The mortar shall be made of the best wood-burnt lime and clean sharp bar sand, sound hair and water.

A cornice to girt sixteen (16) inches, to run around the main halls of the first and second stories and staircase.

In the water closets where there are slate or stone floors, there shall be a cement washboard six (6) inches high, run around all the rooms, and all washboards throughout shall be of cement, made solid to both floors and walls.

CARPENTERS' WORK AND LUMBER.

All the lumber used throughout the whole building shall be the best of its kind, perfectly seasoned, and in all respects suitable for the purposes to which it is applied.

All the joists shall be spaced not less than sixteen (16) inches from centre to centre, backed and bridged, with two rows of diagonal bridging; where the span is less than twenty (20) feet, one row will be permitted.

Double trimmers must be used around all fire places, flues, &c., hung in strong wrought iron stirrups.

The basement joists must rest on dwarf walls, when the span is more than ten (10) feet.

The following are the dimensions of the joists.

In the basement, three (3) by ten (10) inch joists.

In the first and second stories of the centre and end transverse buildings, three (3) by twelve (12) inches.

In the first and second stories of the wards, three (3) by fourteen (14) inches.

In the whole of the attic floor, three (3) by twelve (12) inches.

In the verandahs, three (3) by ten (10) inches.

All the above shall be the best spruce or white pine, perfectly sound, and free from shakes and cracks, and well seasoned.

The ceiling joists shall be of sound young hemlock spaced sixteen (16) inches from centre to centre, and must be three (3) by ten (10) inches in dimensions; those for the verandahs, three (3) by eight (8) inches.

The main roof and skylights of the centre building shall be sustained by two trusses, framed in the strongest manner, the tie-beam to be four (4) by twelve (12) inches, footed on cast-iron shoes, and secured to tie beams of three-quarter ($\frac{3}{4}$) inch wrought-iron bolts, with nuts and screws.

The rafters of the centre building are to be three (3) by twelve (12) inches. In the smaller transverse buildings, where the span is not more than twenty-two (22) feet, the rafters are to be three (3) by ten (10) inches. In the ward buildings, and over the dining room, three (3) by ten (10) inches, and the steep portion of the Mansard roofs, three (3) by ten (10) inches. The whole spaced twenty-four (24) inches from centre to centre, well framed and secured in the best and most substantial manner, all to be of good, sound hemlock. The wall plates must be three (3) by twelve (12) inches, the rafter plates, three (3) by ten (10) inches, notched into and well spiked to the rafters, which shall be of spruce or white pine.

There shall be an air-space or loft between the ceiling joists and the rafters for ventilation, and a tin ventilator placed on each roof in order to ventilate these lofts.

All the partitions that are not shown to be of bricks must be hemlock studding, three (3) by five (5) inches in dimensions where the height of the ceiling is more than ten (10) feet; and three (3) by four (4) inches where it is less. The attic must be studded all around so as to make the walls plumb.

All studding must be spaced sixteen (16) inches from centre to centre, well bridged with two (2) rows of bridging, and trussed so as to throw the weight on the walls.

The whole of the roofs shall be covered with inch thick tongued and grooved, well seasoned white pine sheathing

boards, nailed fast to the rafters, to receive the felt and tin roofing.

The main cave cornice, and the cornice and corners of the mansard roofs, must be made of good sound white pine lumber, free from sap and knots. The gutters formed in the cornice and lined with tin.

The verandas must be framed with white pine boxed posts, white pine cornice and perforated railing.

The floors must be planed, tongued, and grooved of narrow, Delaware yellow pine boards, one and a quarter (1¼) inch thick, well nailed down to the joists, the joints of the veranda floors to be white leaded before being laid. The veranda ceilings, white pine boards planed, tongued, and grooved.

The main stairs and the four private stairs, must be of iron as described in iron work, with walnut hand-rail. There is to be a small staircase in the pantry adjoining the kitchen and dining room to run from the basement to the first story, the steps made of ash, one and a quarter (1¼) inch thick, to have an oak hand-rail with turned ash or maple balusters. The steps of the verandas shall also be of ash one and a quarter (1¼) inch thick, and without risers, must have sawed railing and hand-rail the same as the verandas.

WINDOW FRAMES, BLINDS, AND SASH.

All the window frames (except those in the cellar which will be plank frames) shall be reveal frames; the front centre window on second story to run to the floor.

All the sash must be one and three quarters (1¾) inches thick, double hung with cast-iron weights, best patent axle pullies and patent sash cords will be required. The cellar windows to have sash one and three quarter (1¾) inches thick hung on butt hinges.

Inside rolling blind shutters to fold against the jambs without boxes, one and one-eighth (1⅛) inches thick, must be placed to all the windows of the first and second stories, (ex-

cept the water-closets, bath-rooms, and diet kitchens,) the principal windows of the attic, and the dining-room windows.

On the roof of the centre building shall be placed two (2) sky-lights having one and three quarters (1¾) inch sash hung so as to be opened and closed with cords from the room below; the dead-room must also have a sky-light four (4) feet square, with sash to open as above described.

Ornamental dormer windows shall be placed on all the roofs as shown on the drawings with cornice, turned finials, and galvanized iron rod projecting three (3) feet above the finials; small circular topped attic windows must be placed on the roof of the wards with turned finials, the sash one and three quarter (1¾) inches thick, and hung on hinges.

The corridors and halls in the attic are to be lighted by dormer windows at the ends with sash, one and three quarter (1¾) inches thick, hung so as to open and close by means of cords.

The lumber for the above work shall be of the best quality white pine, the sash and blinds, &c. of the best panel lumber, perfectly seasoned.

DOORS.

All the doors throughout the building must be made of the best panel lumber, framed, glued up and hung on strong butt hinges of iron.

The front door frame, the two side entrances, the two doors opening on to the veranda, and the two side light doors in basement opening to the areas must all be made of three (3) inch plank, and to have side lights with sash one and three quarter (1¾) inches thick.

The main front entrance door shall be in two fold, each fold three (3) inches thick, made of two thicknesses of white pine plank screwed together, six paneled and moulded on both sides, and hung with three pair of five (5) inch butt hinges, and furnished with top and bottom flush bolts, and

first quality American mortice lock with bronzed knobs or handles, &c.

The two side entrance doors, the doors of first story and basement opening to the verandas and areas, shall be single fold six (6) paneled and moulded two and a quarter ($2\frac{1}{4}$) inches thick, hung on five (5) inch butt hinges, and furnished with first quality American locks with porcelain knobs. All the other exterior doors shall be two and an eighth ($2\frac{1}{8}$) inches thick, four paneled double faced, hung on four and a half ($4\frac{1}{2}$) inch butt hinges, and firmly fastened with first quality lock, with mineral knobs.

All the interior room doors in the basement shall be three (3) feet three (3) inches wide by seven (7) feet six (6) inches high, one and three-quarters ($1\frac{3}{4}$) inches thick; four paneled double-faced, hung on four (4) inch butt hinges and furnished with mortice locks and mineral knobs.

The door to water closets, bath rooms, store rooms and pantries, must be in size to correspond with the room doors, one and three-eighths ($1\frac{3}{8}$) inches thick, four paneled, single-faced, hung on three and a half ($3\frac{1}{2}$) inch butt hinges, and have good locks with mineral knobs.

The vestibule door to have side lights, the door in two folds, each fold six (6) panels double-faced, two and a-quarter ($2\frac{1}{4}$) inches thick and furnished with flush bolts, and best quality American locks, with porcelain knobs.

The room doors in the first and second stories, must be three (3) feet six (6) inches wide by eight (8) feet high, one and seven-eighths ($1\frac{7}{8}$) inches thick, six (6) paneled double-faced and hung on four and a half ($4\frac{1}{2}$) inch butt hinges, the fastenings to be first quality American mortice locks with porcelain knobs.

The room doors in the attic to be three (3) feet three (3) inches wide by seven (7) feet six (6) inches high, four (4) paneled double-faced and one and three-quarter ($1\frac{3}{4}$) inches thick, hung on four (4) inch butt hinges, and have mortice locks with porcelain knobs.

The bath rooms, water closets, store rooms, closets, pantries,

&c., must have doors one and three-eighths ($1\frac{3}{8}$) inches thick, single-faced and to correspond in finish with the room doors; the hinges four and a half ($4\frac{1}{2}$) inches butts, and locks to suit the rooms, for which they are used.

The doors to the elevators must be in two-folds with flush bolts and rebate locks. The dumb waiters, drops and shutes must have doors one and a quarter ($1\frac{1}{4}$) inches thick, single-faced, butt hinges and good locks.

All the other doors, not particularly mentioned above, must be made to correspond with those nearest them.

FINISH.

The architraves around the doors of the basement and attic water closets, bath rooms, &c., and on the entresols, must be three and a half ($3\frac{1}{2}$) inches.

The finish around all the windows shall be a two (2) inch bead, the jambs must be inch white pine.

The sills one and a quarter ($1\frac{1}{4}$) inches thick, with plain facia five (5) inches wide.

All of the above must be made of the best white pine and put up in the best manner.

There must be two elevators to run from the basement to the attic, each measuring five (5) feet nine (9) inches by five (5) feet six (6) inches; these elevators to be constructed with top and bottom platform, placed six (6) feet apart and connected together with four (4) one (1) inch round iron rods, one at each corner—these rods shall join together over the centre of the top where they shall terminate; at this point shall be attached the three quarter ($\frac{3}{4}$) inch wire rope, to which is fast ened the balance weight. The sides of the elevator shall be boarded up with inch boards, planed on both sides and tongued and grooved, the whole made light but strong.

The inside of the well in which the hoist works, must be lined with inch white pine boards, planed, tongued and grooved. Guides to run each side from top to bottom, and an iron ratchet (with stop working on the inside of the hoist,) at any point between the top and bottom of the guides.

All the hoisting apparatus must be of the most approved kind, safe, economical of power, and must be operated by hand.

The wells for the dumb waiters must be lined the same as the hoists, and must have grooved guides, weight boxes, &c.

The dumb waiter shall be two (2) feet by three (3) feet, and worked by weights, pullies, &c., in the latest and most approved manner.

There shall be drops for clothes and drops for dust from each story and attic, placed alongside of the private staircases, all lined with inch white pine worked boards, tongued and grooved, these drops to measure about twelve (12) by eighteen (18) inches, and have close-fitting doors to each story, and at the bottom, twelve (12) by twenty-four (24) inches.

The water closets shall have white pine seats, one and five eights ($1\frac{5}{8}$) inches thick, with inch thick lids, hung on hinges, and inch thick risers.

The wash-stands enclosed, and have doors in front.

The slop-sink enclosed, and lids hung on hinges; all to be of the best white pine, and fitted up in the most substantial manner.

The store-rooms shall each have on an average of one hundred and fifty feet (150) of shelving, twelve (12) inches wide, and the closets to have the customary amount of shelving.

HARDWARE.

The hardware throughout shall be the best quality American hardware. The basement doors shall have four and a half inch ($4\frac{1}{2}$) upright mortice locks, with mineral knobs, and four and a half inch ($4\frac{1}{2}$) butt hinges.

The first and second story room doors to have five and a half inch ($5\frac{1}{2}$) mortice locks, with porcelain knobs, and four and a half inch ($4\frac{1}{2}$) butt hinges.

The double doors to have six (6) inch rebate locks, five and one half inch ($5\frac{1}{2}$) butt hinges, and flush bolts.

Bronzed bell pulls shall be used for the entrance doors in front.

The front door to have bronze handles or knobs.

All the window shutters furnished with the most approved brass catches screwed on.

All the closet and store-room doors must have strong locks, knobs and keys complete. Duplicate keys must be furnished to all the locks.

The attic doors, four and a half inch ($4\frac{1}{2}$) mortice locks and mineral knobs, and four and a half inch ($4\frac{1}{2}$) butt hinges.

There must be not less than eight hundred (800) strong japanned clothes-hooks put up as may be directed.

And all other hardware necessary to complete the building must be furnished, and be in conformity with that already specified.

PAINTING AND GLAZING.

All the wood work and iron work exposed inside usually painted shall have four (4) good coats of paint made of the best white lead and boiled linseed oil, and finished white or in plain tints as may be directed by the architect.

All the exterior wood work shall have four (4) coats of paint, and sanded to imitate the brown stone used in the building.

All the glass used in the building must be the best American double thick glass, and perfectly free from all imperfections, it shall be bedded, sprigged, and back puttied, and of the sizes shown on the drawings.

GAS FITTING.

The whole building shall be supplied with gas from the city mains, the size of the mains and supply pipes in accordance with the city regulations, the number of burners will be as follows:—

BASEMENT.

Kitchen, six (6) pendents.
Halls and corridor, nine (9) brackets.
Rooms, six (6) pendents, two (2) lights each.
Bath room, water closets, &c., six (6) brackets.
Bake-house and store cellars, four (4) pendents, two (2) lights each.
Cellars, eight (8) pendents, two (2) lights each.
Store rooms, &c., six (6) brackets.

FIRST STORY.

Vestibule, one (1) two (2) light pendent.
Halls and corridor, one (1) four (4) light pendent.
Halls and corridor, two (2) two (2) light pendent.
Halls and corridor, two (2) brackets.
Officer's parlor, one (1) two (2) light pendent.
Officer's dining-room, one (1) two (2) light pendent.
Reception room, one (1) two (2) light pendent.
Apothecary's shop, one (1) two (2) light pendent.
Apothecary's shop, two (2) brackets.
Assistant surgeon's apartment, each room, one (1) two (2) light pendent.
Diet kitchens, each, two (2) brackets.
Private wards, each, one (1) one (1) light pendent.
Main wards, each, three (3) two (2) light pendents.
Smoking rooms, each, one (1) two (2) light pendent.
Bath rooms, each, one (1) bracket.
The principal water closets, each, one (1) bracket.
Nurses rooms, each, one (1) bracket.
Wash rooms, each, one (1) bracket.
All stair-cases, each, one (1) bracket.
In the second story there will be about the same number of burners that is required in the first story.

ATTIC STORY.

Wards, six (6) two (2) light pendents.
Bed-rooms, six (6) brackets.
Attic in wards, six (6) brackets.
Dead room, two (2) pendents.
Halls and corridors, four (4) pendents.
Water-closets, each, one (1) bracket.
Bath room, one (1) bracket.

The stairs to have brackets on each story. And brackets must be placed where required, to thoroughly light the building. All pendents and brackets must be fitted up in a neat and substantial style in keeping with the rooms in which they are placed.

IRON WORK.

There must be twenty (20) nine (9) inch rolled iron beams, each twenty-two (22) feet long and eight (8) seven (7) inch rolled iron beams, each sixteen (16) feet long, for the floor of the principal water closets.

Strong wrought-iron stirrups two (2) inches wide by three-eighths ($\frac{3}{8}$) of an inch thick, and draw bolts placed to all the trimmers.

One inch camber rods shall be used for all the floors where the span is more than sixteen (16) feet. One (1) inch round wrought bolts shall be used for the trusses in the roof, and three-quarter inch bolts, with screws and nuts for the same.

There shall be one thousand (1000) anchors, $1\frac{3}{4}$ inches wide by $\frac{3}{8}$ inch thick, to average three (3) feet in length, with heads of same fifteen (15) inches across, secured with three rivet head spikes, distributed throughout the building where required.

All the door and long window frames to be secured with joggles.

CAST IRON STAIRS.

The principal stairs and landings shall be of cast iron, the steps of the middle flight eight (8) feet long, and the return flights six (6) feet long, the tread eleven (11) inches and seven (7) inch rise on the horse. Cast iron balusters, measuring two and a half ($2\frac{1}{2}$) inches at the base, (the handrail to be of walnut).

The bearers shall be wrought iron and trussed. The landings supported by nine-inch rolled beams, also a nine (9) inch beam at the foot of the stairs in first story, resting nine (9) inches on the side walls at each end.

There shall be two flights of steps and platform leading to the side entrance doors in front, made of cast iron, with wrought iron horses, the steps measuring six (6) feet eight (8) inches long eleven (11) inch tread and seven (7) inch rise, and to have cast iron railing.

All the private stairs and landings must be cast iron, supported on wrought iron horses, the steps eleven (11) inches tread and seven (7) inches rise, two (2) inch balusters and walnut handrail, the whole shall be put up in the best and most substantial manner.

Cast iron shoes and plates for the trusses of the roof, and cast iron plates for the bearings of beams, girders, &c., where deemed necessary.

The mansard roofs must have a neat cast iron railing, four (4) feet high, running all around the flat portion, fitted up and secured to the roof with wrought iron chairs and stays, galvanized where they rest on the tin roofing, the screw heads covered with tin caps soldered to the roof to prevent leakage.

All the cast iron work that may not have been mentioned, and requisite to complete the building shall be performed and furnished.

BELLS AND SPEAKING TUBES.

There must be three (3) bells situated in the hall of the basement, communicating with the three pulls of front entrance doors with copper wire, the whole put up with tin tubing in the most substantial manner.

Tin speaking tubes, with signals, must be placed along side of all the dumb waiters and hoists from each story to the basement.

LIGHTNING RODS.

There shall be five (5) copper lightning rods running from a secure point within the ground to the highest points of the building, and tipped with the best platina points, the whole put up with glass insulators in the most efficient manner.

ENGINE, BOILER HOUSE AND COAL SHEDS.

The engine house and coal sheds shall be built on the low portion of the ground adjoining Sutherland Avenue, as shown on the block plan.

The engine house shall be built of bricks with a slate roof and shall be forty-five (45) feet six (6) inches, by fifty-two (52) feet and one story high, containing a

Boiler room.....12 ft. 0 in. by 22 ft. 0 in.
Engine room.....10 ft. 0 in. by 18 ft. 0 in.
Workshop.....13 ft. 7 in. by 18 ft. 0 in.
Engineer's room.....10 ft. 0 in. by 18 ft. 0 in.
Ironing room.....26 ft. 7 in. by 24 ft. 4 in.
Drying room with drying horses.....12 ft. 0 in. by 12 ft. 0 in.
Washing room.....15 ft. 0 in. by 22 ft. 0 in
Fan room.....10 ft. 0 in. by 12 ft. 0 in.

Three water closets with an ash pit.

The foundation walls of the building, the stack and shed shall be of good building stone, the walls under the building eighteen (18) inches thick. The foundation under the smoke and ventilating stack shall be of large, flat foundation stone. In the three lower courses the stone shall be not less than four (4) feet long by two (2) or three (3) feet wide and laid crossing each other, and well settled down with a heavy rammer (as this part of the ground was formerly used as a burial place, the bodies being removed and graves filled up), it will be necessary for the foundations of the stack, buildings, and sheds, &c., to extend below the depth of the old graves, to a perfectly secure and solid foundation.

The foundation of stack shall be not less than fifteen (15) feet square in the bottom and diminish by offsets until it reaches the surface of the ground, where it shall measure ten (10) feet square.

The foundations of the piers for the sheds, must be six (6) inches thicker than the brick piers.

The whole laid in the best gravel mortar in the most substantial manner.

CUT STONEWORK.

There shall be a base of stone the same as used in the Hospital building, to extend all around the building, it must be one (1) foot high, and eight (8) inches thick; granite sills to all the doors, and brown stone sills five (5) inches thick to all the windows. The chimneys must also be capped with stone; the air duct extending from the wall or bank, to the engine house, shall be arched over with bricks and covered with North river flag-stone, two and a-half (2½) inches thick.

A six (6) inch curb shall extend around the sidewalk and around the cartway (as shown on the drawing). A North river flag-stone gutter must be placed alongside the curb. The stone wall at present standing against the bank shall be repaired and capped with flag-stone two (2) inches thick.

A cobble stone pavement shall be laid around the building and shed as marked (cart way on the drawing,) and to extend from the engine house to the main entrance gate on Sutherland avenue.

Two tramways of North river flag stone shall be laid across the pavement of Sutherland avenue, from the wall to the curb at the new gate, which shall be cut through the wall.

Stone capping four (4) inches thick shall be placed on the new gate piers, and two granite guard posts placed against the piers, four (4) feet high and eighteen (18) inches thick.

BRICK WORK.

The exterior walls of the engine house shall be thirteen (13) inches thick, faced with press bricks, the interior walls nine (9) inches thick. Flues built and topped out as shown on the drawing.

The stack must be seventy-two (72) feet six (6) inches in height, and measure nine (9) feet square at the base, and seven (7) feet diameter at the neck below the cap. The exterior faced with pressed bricks, that portion above the roof of engine house to be built octagonal, and with brick cap as shown on the drawing. The wall at the top covered with a cast iron cap with a drip. The smoke flue to be circular two (2) feet six (6) inches in diameter, the ventilating flue to be one (1) foot in width, and run all around the smoke flue, and be separated from it by a nine (9) inch brick wall, these flues must be well pargetted, perfectly smooth, and the whole built in the most substantial manner.

A brick pavement shall extend all around the engine house as shown on drawing, laid with first quality paving bricks in a good bed of gravel. The boiler room, engine room, and ash pit also paved with bricks.

SLATING.

The roof of the engine house must be of the best quality roofing slate nailed on sheathing boards with galvanized iron

nails, the gutters, spouts, &c., must be of single leaded tin, the whole put on in the best manner and made perfectly water tight.

CARPENTER WORK.

The joists shall be three (3) by ten (10) inches, the ceiling joists three (3) by eight (8) inch hemlock and spaced sixteen (16) inches from centre to centre, the rafters three (3) by ten (10) inches, spaced twenty-four (24) inches from centre to centre. The floors must be one and a quarter ($1\frac{1}{4}$) inch thick Delaware heart yellow pine boards, planed, tongued and grooved; the engine and boiler rooms paved with bricks.

The doors must be four paneled, one and three quarters ($1\frac{3}{4}$) inch thick, hung on strong butt hinges, and have good locks.

The windows reveal frames, double hung on weights and pulleys; the sash one and three-quarter ($1\frac{3}{4}$) inches thick.

A surbase four (4) feet high, to extend all around the rooms, made of inch white pine boards, planed, tongued and grooved.

The washboard six (6) inches high with two (2) inch moulding, the finish around doors and windows a four (4) inch moulding.

The water closets fitted up all complete and with a latticed screen in front.

On the roof shall be placed a ventilator, as shown on the elevations to supply fresh air to the fan.

PLASTERING.

The interior of the wall must be plastered with three (3) good coats of plastering, finished hard and white, in the best manner.

HARDWARE.

The hardware must be of the best quality, and suitable for the purposes to which it is applied, butt hinges shall be used on all the doors except those of the boiler room where there shall be wrought iron strap hinges; wrought iron stays,

straps, &c., shall be used where necessary in the construction of the building, shed, &c.

PLUMBING.

There shall be three (3) regular water closets with enamelled hoppers, placed as shown on the drawing, hot and cold supply to the wash room. (Wash tubs, &c., as described in heating drainage, &c., of the main building.)

PAINTING AND GLAZING.

All the wood work must have four (4) good coats of white lead paint the glass must be the best American, sprigged and back puttied.

FUEL SHED.

The fuel shed and tool house shall be seventy-eight (78) feet long by twenty (20) feet wide and ten (10) feet high, built against the present wall on Sutherland avenue, and on brick piers, (as shown,) the wall topped out to suit the height of the roof.

The rafters shall be three (3) by twelve (12) inch joists, upon which shall be placed sheathing boards to receive the tin roofing, which shall be best quality charcoal roofing tin, painted on both sides and made perfectly water-tight.

The floor of the shed must be three (3) inches thick hemlock plank, spiked fast to four (4) by six (6) inch sleepers bedded in gravel.

The tool house shall have a ledge door, wrought iron strap hinges and padlock, hasp, &c., all complete.

A gateway shall be cut through the wall on Sutherland avenue, to be used for carting in fuel, &c. Brick piers built with stone bases and caps and wrought iron eyes, walled in for the hinges.

The gate shall be of wood three (3) inches thick and hung on strong wrought iron strap hinges, fastened with a swing bar, bottom bolt, padlock and hasp.

The whole of the above work on engine house, and sheds, &c., shall be done in a complete and substantial manner, and in conformity with the work specified for the hospital building proper.

PLUMBING, HEATING, VENTILATING, CULINARY AND LAUNDRY WORK.

Boilers.—There will be required two (2) tubular boilers, each forty (40) inches in diameter by twelve (12) feet long, each to have thirty-four (34) three inch lap welded flues. The shells of the boilers must be made of at least number four (4) iron, the heads of number one (1), they must be set up in brick work having all the fire surfaces lined with fire brick: the fronts to be of paneled cast iron, and the boilers made complete with steam, and blow-off valves, dampers, dry and steam gauges, and feed connections.

They must also be so connected that one or both may be used at pleasure.

Engine. — There must be erected on a cut stone foundation in engine room of boiler house, one finished steam engine ten (10) by twenty-four (24) inch cylinder with Carpenter's new patent cut-off and regulator, and fly-wheel to be turned and balanced.

The engine set up complete with steam and exhaust pipes and connections.

Pump.—There will be required for feeding the boilers, set up in boiler house on a cut stone foundation, one number two (2) Woodward Steam Pump with metal valves, and with all necessary steam and water connections and valves, and connected in such a manner as to feed either one or both boilers as required.

Fan.—One ventilating fan ten (10) feet in diameter set up on a substantial brick foundation in a suitable chamber, will be required to furnish a continual supply of fresh air through the main air duct to all the coil chambers, this fan must be connected with requisite shafting and belts to the fly-wheel of engine.

Coils.—Twelve thousand three hundred and fifty (12,350) feet of one inch wrought-iron heating pipe will be required, divided up in "Box Coils," constructed with manifolds with the requisite number of outlets, return bends, tapped at a sufficient angle to entirely drip the coils of all condensed steam, and firmly bound together with cast iron stands, each coil must be proportionate in size to the amount of space it will be required to heat and placed in a chamber so connected as to receive a full supply of fresh air from the fan through the main air duct. From the top of each coil chamber, over the coil will start a suitable flue to carry the heated air to the room or rooms above. Each of these coils will be connected to the main steam and exhaust pipes as hereafter described.

Mains.—Leading from the boilers must be of wrought-iron lap-welded steam pipe of not less than three (3) inches inside diameter to supply steam to all the coils. This main will enter the building at the most convenient point from boiler house and run the entire length of the building feeding the coils with branch pipes running right and left, it will diminish in size as the branches are taken off to the different chambers.

In this main, immediately adjoining the boilers, must be a globe valve with brass fittings corresponding in size to the main at that point, to control the steam throughout the building. Care must be taken in running this main to provide thoroughly for the expansion and contraction, either with brass expansion joints packed with stuffing boxes or by breaking the straight runs every twenty feet with elbows.

Exhaust Mains.—To carry off the condensed steam from the coils there must be an exhaust main one inch less in size than the steam main leading back, and increasing in size as the wastes from the different coils are added, to a tank adjoining the boiler and engine house; the hot water there collected to be repumped into the boilers, that steam and fuel may be economized. This main will follow the course of the

steam main and be run with similar fittings and in the same manner.

Valves.—For the more perfect control of the heat there must be attached to each coil in convenient positions, and on both feed and exhaust pipes corresponding in sizes thereto, brass globe valves with loose spherical seats and of the best material and workmanship.

Summer Main.—In addition to the three-inch main already described, and connected to either one or both boilers, must be a summer main carrying and supplying steam for kitchen and laundry uses, and of size sufficient to meet all requirements.

Registers.—At each and every opening where heat is admitted into the building through flues must be a black enameled register of Tuttle & Bailey's patent, also ventilators of the same patent will be required.

Kitchen.—There will be required for the kitchen one large cooking range, having two fires and three ovens, six (6) tin steamers for steaming bread, puddings, vegetables, &c.; these steamers must be set on a cast-iron drip pan, furnished with grates and connected with summer main steam pipe, by a ground joint at back of steamer, in order that the vessel may be lifted on or off at pleasure.

Two forty (40) gallon copper kettles, tinned inside, and entirely surrounded with a steam jacket, having all necessary valves and connections for steam and exhaust pipes, and two twenty gallon double kettles as above, for tea and coffee, each of these kettles to be set firmly on a cast-iron stand with wrought iron legs and screwed firmly to the floor, and each properly connected to the summer steam pipe before described. There will also be required one rotary coffee roaster, of the most approved construction.

Laundry.—In the laundry will be required eight wooden wash tubs, each two (2) feet by two (2) feet three (3) inches,

one rinsing tub, one boiling tub, each connected in the most convenient manner with hot and cold water and steam pipes, with the necessary valves for each, also one blueing tub with cold water attachments, one six-tub power "Washing Mill," of the Shaker patent, one power mangle, one number two centrifugal clothes wringer; these connected by shafting and pulleys of required sizes and belting to the fly-wheel of engine.

Also one drying closet twelve feet by twelve feet, furnished with fourteen wooden clothes horses, running with rollers on iron tracks, screwed to the floor and held in position by guides above. To each horse there must be a coil of one-inch wrought iron pipe, four pipes high, supported by cast-iron brackets or stands, securely screwed to the floor, and running parallel with and one foot less in length than the clothes horses, all these coils to be connected to the summer steam main, and furnished with valves for their regulation.

Cold and hot water attachments will be required to all the washing tubs, and furnished with finished brass bibs. The water pipes here, as before, must be of galvanized wrought-iron pipes connected with suitable cast galvanized fittings.

The main cold water pipe supplying the laundry will be two inches in diameter inside, and reduced as branches are taken off.

Each of the tubs will waste through a one and one-half inch pipe conveniently connected into the main drain from the building, and each furnished with the usual brass-tub connection with plug and chain.

Water-closets and Soil-mains.—At the extreme end or wing of each ward in each of the first and second stories, as located on the plans, will be required six water-closets, each furnished with one enameled iron soil-pan set firmly on a six-inch cast branch-pipe, connected into a vertical main not less than six inches in diameter at the second story and increased in size to eight inches (inside). After it receives the wastes from the closets on the first floor, this main will lead into the

twelve-inch horizontal drain of the building, and have at its base a suitable iron trap. Above this trap in the vertical drain must be a branch pipe of eight inches diameter, for ventilation, leading to the flue of the boiler, or the nearest suitable smoke-flue of the building. Each closet will be supplied through half-inch galvanized iron pipe, with fresh-water tanks, and made complete with the necessary water-closet valves.

Bath-tubs.—There will also be required in each of the above wings, as shown, four number one (1) hospital bath-tubs, each supplied with hot and cold water through three-quarter-inch valves, and feeding and wasting from the bottom, and having one and one-quarter-inch overflow pipes connected with cast-iron fittings to the waste pipe.

Wastes.—The wastes from all the bath-tubs must be one and one-quarter inch inside, and connected into the vertical drains from the water-closets, or carried independently down into the main drain of the building.

Wash-basins.—In each of the above wings, in first and second stories, as before, will be required four enameled iron wash-basins set in a marble slab, as shown on plans, and each supplied with cold water by bib cocks. These basins will have three-quarter-inch waste pipes leading into the main drain, complete with all attachments.

There will also be connected with each of the above series of water-closets, two enameled urinals, supplied with a continuous flow of fresh water.

In the basement in the main part of the building under each of the diet kitchens, located as shown, will be two water-closets, one bath-tub, and two urinals, all as above described.

Sinks.—In the kitchen must be one large cast-iron sink, seven feet long, supplied with hot and cold water through three-quarter inch finished brass bib cocks, and having a one-and-one-half-inch waste pipe to the main sewer or drain.

In each of the private wards of first and second stories will be required one water-closet and one wash-basin (as before described), the latter furnished with hot and cold water through brass bib cocks. The vertical drains from each water-closet must not be less than four inches inside diameter.

In each of the four diet kitchens on the first and second floors, must be a cast iron sink twenty-four (24) inches long, furnished through brass bib cocks with hot and cold water, wasting as before into the main drain.

In closets adjoining both the officer's dining-room and apothecary's room as shown, will be cast iron sinks supplied as before with hot and cold water.

Adjoining the officer's ward in the second story will be one bath tub, one wash basin each, as before, with hot and cold water, and one water-closet all complete with attachments. Adjoining the operating room will be one water closet, one wash stand, and one iron sink, the two latter having hot and cold water.

Over each diet kitchen on the first floor will be required two bath tubs and three water-closets, all as before described, and wasting into a vertical six inch drain pipe, connected to the main sewer as shown on the plans.

In the attic there will be one bath tub, five water-closets, and two urinals, all located as on plans, and having the necessary attachments for feed and waste.

Slop Hoppers.—In each of the halls in the first, second, and attic stories will be required two slop hoppers with lids, and furnished with hot and cold water through three quarter inch brass bib cocks, and wasting through one and one quarter inch pipes into the main drain.

Cold Water Tanks and Pump.—In the upper story located as may be directed by the architect, will be required two wrought iron tanks, each eight feet in diameter by eight feet high, securely braced with angle iron, and connected with feed

pipe from pump, and supplying all the water pipes throughout the building through suitable sized mains; each tank must also have an overflow pipe of not less than three inches in diameter to carry off the excess into either the main drain of the building or otherwise. To supply these tanks will be required one No. 4 Woodward Steam Pump set upon a foundation of dressed stone in engine and boiler house, and connected with all steam, exhaust, and water pipes necessary to supply the building.

Hot Water Tank.—In the basement conveniently located will be one hot water boiler eight feet long, twenty-four inches in diameter, with copper flues to supply hot water to all the kitchens, &c.; it will receive steam from the summer steam pipe, and cold water from tanks through a one and one-half inch main.

The hot water main will be one and one quarter inch, branching either way in the basement, and ascending through the several series of water-closets, throwing off one-half inch branches as are required to feed wash basins, and three quarter inch to bath tubs and sinks.

There will be another hot water boiler corresponding to the above, placed in the boiler house, supplied with exhaust steam from the engine and pumps to furnish hot water to the laundry, and receiving its supply as before from the water tanks.

Water Mains.—All the mains for the conveyance of hot and cold water throughout the building must be of galvanized wrought iron pipe substantially put up with galvanized cast fittings; all the waste pipes over one and one-half inch to be of cast iron, all under of galvanized wrought iron.

DRAINAGE.

The whole of the buildings, together with surrounding pavements and areas, must be drained through the very best

Terra Cotta vitrified drain pipe, discharging at points beyond low water mark on the Schuylkill River, and shall be of the sizes shown upon the basement plan, as follows:

The main pipes commencing at the centre building east front and running around each flank to the rear, shall be ten (10) inch pipe, from thence to the intersection twelve (12) inch pipe, and from the intersection of the twelve inch pipes to the low water mark of the Schuylkill River, fifteen (15) inch pipe. The branches from the water closets, bath rooms, &c., eight (8) inches, and from the rain water conductors and waste pipes, six (6) inches.

There shall be inlets for surface drainage having cast-iron gratings and frames, &c., with traps and eight (8) inch pipe emptying into the mains.

Traps shall be placed to all rain conductors, inlets and soil pipes, &c.

A ten (10) inch drain pipe shall be laid from the main drain to the line of the engiue house, and from thence around the building, it shall be eight (8) inches, with eight (8) inch branches to the water closets and six (6) inch branches to the wash room, engine and boiler room. Inlets for surface drainage placed, wherever necessary, to thoroughly drain the pavements and areas.

All pipes with their connections must be laid and cemented in the most perfect manner, the soil being filled in and rammed down solid in the trenches, and all superfluous earth removed as already specified.

In all cases where the new building or its appurtenances interferes with or obstructs the present line of sewer from the Asylum building, the contractor shall be required to construct a new sewer for the Asylum and grounds so that the present drainage shall be left in complete and effective condition.

In conclusion, the architect considers it due to himself as well as to the Department, to impress upon all bidders the fact that the buildings above specified are intended to be completely and substantially built; and it being impossible to specify every particular item of materials and workmanship required, it must be distinctly understood that whatever is necessary to execute the plans and specifications in their spirit must be included in the proposal. Therefore no allowance will be made for any ignorance on the part of the contractor as the work progresses, as the architect will faithfully supply, when asked, all information, written and verbal, necessary to a clear and perfect understanding of his design, previous to the proposals being made.

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